

New and Additional Records of Ground Beetles and Wrinkled Bark Beetles for Virginia (Coleoptera: Carabidae, Rhysodidae)

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ABSTRACT

Three ground beetles (Carabidae), *Dyschirius erythrocerus* LeConte, *Badister f. flavipes* LeConte, and *B. grandiceps* Casey, and one wrinkled bark beetle (Rhysodidae), *Clinidium apertum allegheniense* Bell & Bell, are reported from Virginia for the first time. Specimen data also are presented for five species, *Pasimachus punctulatus* Haldeman, *Dyschirius larochellei* Bousquet, *D. pallipennis* (Say), *Agonoleptus rotundicollis* (Haldeman), and *Agonum rufipes* Dejean, recently added to the Virginia carabid list (without details) in Bousquet's (2012b) revised North American checklist. Additional records are provided for *Tachys oblitus* Casey, first reported for Virginia by Hoffman (2010). *Cicindela puritana* Horn is removed from the Virginia list due to a lack of records. The number of carabids (530) and rhysodids (5) recorded from the state now totals 535 taxa (528 species and seven subspecies).

Key words: beetle, Carabidae, Rhysodidae, Coleoptera, Virginia.

INTRODUCTION

The varied habitats in the Commonwealth of Virginia support a diverse ground beetle (Carabidae) fauna, now known to exceed more than 500 species, with the total continuing to increase with additional sampling, curatorial efforts, taxonomic revisions, and descriptions of new species. Hoffman et al. (2006) added 30 species and one subspecies to the state list, raising the total to 500 species and seven subspecies (reported as 506 "species"). We have since determined that one of these species, *Loxandrus brevicollis* (LeConte), had been reported from Virginia in an earlier paper (Anderson et al., 1995) in this journal. Also, some additional prior literature had been overlooked. Bousquet (1996) cited a Virginia Beach

specimen of *Oodes americanus* Dejean and Will & Liebherr (1997) described *Loxandrus icarus* from Virginia. The latter authors also synonymized *L. inferus* Allen with *L. velocipes* Casey, both of which had been listed for Virginia by Bousquet & Larochelle (1993). Will (1999) added *Lophoglossus vermex* Casey based on a USNM specimen bearing a state label only. Hieke (2000) reported *Amara ovata* (F.), an introduced species, from Shenandoah County, resurrected *A. flebilis* (Casey) from synonymy with *A. angustata* (Say) (and provided VA records for both), and noted that he had examined specimens of *A. littoralis* Dejean from every (continental) state and province in North America (no details of any VA records were provided). The latter species had been recorded by Bousquet & Larochelle (1993) from 37 states and 12 provinces, but not Virginia. Bousquet (2012b) listed *A. littoralis* from 47 states, including Virginia. Sokolov et al. (2004)

*Deceased

described 17 new species of the forest litter-inhabiting genus *Anillinus* from the southeastern United States, including *A. erwini* from the mountains of western North Carolina and southwestern Virginia.

Hoffman et al. (2006) corrected several errors of relevance to Virginia contained in the North American carabid list compiled by Bousquet & Laroche (1993), but they failed to note that *Cicindela puritana* Horn (= *Ellipsoptera puritana* [Horn]) was incorrectly attributed to the state by these authors (as well as Bousquet, 2012b). All historical and current Chesapeake Bay populations of this federally threatened species (Puritan Tiger Beetle) are confined to the Maryland portion of the Bay (Knisley & Schultz, 1997). There are no known specimen records from Virginia.

Sixteen additional carabids, including one introduction and eight species new to science, were reported from the state through mid-2012. Species recently described from southwestern Virginia include *Pterostichus barri* (Bousquet, 2006b), *Serranillus septentrionis* (Sokolov & Carlton, 2008), and *Maronetus hoffmani* (Barr, 2009). Bousquet & Webster (2006) described the widespread (New Brunswick and Quebec south to Virginia) species *Bembidion iridipenne* and listed paratypes from Highland County. Maddison (2008) described four new species of *Bembidion*, of which two, *B. arenobilis* and *B. rothfelsi*, are known from Virginia. He also resurrected *B. antiquum* Dejean from synonymy of *B. chalconum* Dejean and plotted Virginia records for both. Subsequently, Maddison (in Maddison & Arnold, 2009) described eastern populations of *B. aenulum* Hayward as the new species *B. paraenulum*. More recently, Bousquet (2012a) described *Platynus daviesi* (type locality is in Shenandoah National Park) as a species distinct from *P. parmarginatus* Hamilton. The new species inhabits the Appalachian Mountains from Connecticut to northwestern Alabama, whereas southwestern Pennsylvania is the nearest record to Virginia for *P. parmarginatus*.

Platynus opaculus LeConte was first documented in Virginia during the 2006 Potomac Gorge Bioblitz (Evans, 2008). *Calosoma sycophanta* L., an Old World species that was introduced to northeastern North America nearly a century ago to control gypsy moth populations, has become established in northern Virginia (Carrington, 2002; Evans, 2009). Finally, Hoffman (2010) added five species to the state's fauna based on recent collections from Quantico Marine Corps Base. One of these, *Lebia atriceps* LeConte, is a western species captured far out of range, presumably the result of anthropogenic transport. A summary of the various additions and deletions to the Virginia carabid list since the records presented in Hoffman et al. (2006)

appears in Table 1.

A revised and greatly expanded checklist of North American Trachypachidae (three western species), Rhysodidae (wrinkled bark beetles; eight species), and Carabidae (2,428 species) was recently prepared by Bousquet (2012b). He cited records for 531 taxa in Virginia (520 native and 11 adventive, exclusive of *Lebia atriceps*), thus ranking it fifth among all states and provinces on the continent, trailing only Texas (693 native and one adventive), California (646 + 12), North Carolina (536 + 4), and New York (528 + 21), and tied with Ontario (510 + 21). The Virginia total (527 carabids and four rhysodids) represents 20% of the native North America fauna (Bousquet, 2012b). The previous checklist (Bousquet & Laroche, 1993) tallied 446 taxa for Virginia, ranking it 14th among all states and provinces at that time. Thus, the known carabid fauna of Virginia increased by 19% during the past two decades, primarily as a result of additional field sampling. Bousquet's (2012b) new compilation added 15 species (and one subspecies) to the Virginia list, removed three others, and questioned the status of four more (Table 1). Taxonomic changes also accounted for some name swapping or additions and deletions to the state list.

In this paper we report three ground beetles and one wrinkled bark beetle new to the Virginia fauna, thus increasing the documented total for both families to 535 taxa (528 species and seven subspecies), including 530 carabids and five rhysodids. Furthermore, the troglobitic cave beetle genus *Pseudanophthalmus* contains 148 recognized species, of which 31 occur in Virginia, including 28 endemics (Barr, 2004). Barr (2004) noted that he had studied material representing approximately 80 additional, undescribed species in this genus, 9 or 10 of which occur in Virginia (T. C. Barr, pers. comm., 2008). With the passing of Dr. Barr on 29 April 2011, and in the absence of an obvious successor to fill the void, it may be decades before these species are formally described and officially added to the Virginia carabid list, which will undoubtedly surpass 550 species.

In the accounts below we follow the sequence and nomenclature of Bousquet (2012b). VDNH signifies specimens captured during surveys made by personnel of the Division of Natural Heritage, Virginia Department of Conservation and Recreation. UV indicates capture with blacklight (ultraviolet light), either at sheet or with a bucket trap, and DF signifies a drift fence-pitfall trap array. Unless otherwise specified, all specimens cited in the species accounts were determined by RLH and are in the collection of the Virginia Museum of Natural History (VMNH).

RHYSODIDAE

Bousquet (2012b) noted that more than 90% of the approximately 355 species worldwide inhabit the Southern Hemisphere. He listed four species from Virginia: *Omoglynumius americanus* Laporte, *Clinidium baldufi* Bell, *C. rosenbergi* Bell, and *C. sculptile* Newman. The known ranges of other members of this family (Bell & Bell, 1985) suggested that two additional species might occur in Virginia, one of which is now confirmed:

Clinidium apertum allegheniense Bell & Bell
NEW STATE RECORD

Cumberland Co.: 2 km SW of Columbia, hardwoods north (DF), 16 July 1990, J. C. Mitchell (1; det. A. V. Evans). *Henry Co.*: 2 mi SW of Irisburg, Smith River, Va. Rt. 636, 16 May 1993, R. L. Hoffman (1).

This beetle was previously known from southwestern Pennsylvania and Mount Mitchell, North Carolina (Bell & Bell, 1985; Bousquet, 2012b). An earlier report from Ohio requires confirmation (Bousquet, 2012b). Both Virginia records are from the Piedmont region of the state.

Clinidium valentinei Bell inhabits the Appalachian Mountains from southwestern Pennsylvania to north-central Alabama and northeastern Georgia (Bell & Bell, 1985; Bousquet, 2012b), but it has not yet been documented in Virginia.

CARABIDAE

PASIMACHINI

Pasimachus punctulatus Haldeman

Citing Carrington's (2002) unpublished thesis, Bousquet (2012b) added this species to the Virginia list. A total of 28 specimens was captured during a 4-year pitfall trapping survey on the George Washington National Forest in Augusta County (Carrington, 2002).

VMNH has 20 specimens of *P. punctulatus* from six sites in five counties: *Augusta Co.*: Maple Flats near Sherando [George Washington National Forest], 17 May 1988, K. A. Buhlmann (1); George Washington National Forest, 5 mi W of Stokesville, 17 June 1989 (4), 9 July 1989 (1), all B. Flamm. *Botetourt Co.*: Carvins Cove boat landing, 31 May 1994, M. Donahue (1). *Franklin Co.*: Grassy Fork Creek at Va. Rt. 619, 6 May 1989 (1), 2-30 August 2000 (1), both R. L. Hoffman. *Lunenburg Co.*: Juniper Creek at Va. Rt. 690, 4 mi N of Rehoboth, 19 June-3 July 1991 (4), 3-17 July

1991 (1), 17 July-1 August 1991 (3), all VMNH DF survey [R. L. Hoffman et al.]. *Mecklenburg Co.*: Elm Hill Wildlife Management Area, Clyde's Pond, open field, 10 July-1 August 1995 (2), 26 August-20 September 1995 (1), all VMNH DF survey [R. L. Hoffman et al.].

The range of *P. punctulatus* extends from New Jersey to Florida, west to Kansas and Texas, and south into northern Mexico (Bousquet, 2012b).

DYSCHIRIINI

Bousquet & Larochele (1993) listed seven species of *Dyschirius* from Virginia. Hoffman et al. (2006) added *D. pumilus* (Dejean) and Bousquet (2012b) listed two more species (*D. larochellei* and *D. pallipennis*) for the state. We include VMNH records for these last two species and add one congener to the Virginia list:

Dyschirius erythrocerus LeConte
NEW STATE RECORD

City of Virginia Beach: False Cape State Park, main park road southwest of junction with Barbour Hill Trail, live oak-oblolly pine forest, 5 July 2005, uv, S. M. Roble, VDNH (1).

The known distribution of this small beetle (4-5 mm) extends from New Brunswick and Maine to South Dakota, southward to Delaware, Arkansas, and Louisiana (Bousquet, 1988, 2012b). Our specimen from False Cape thus represents a slight extension of the range along the Atlantic Coast and presages discovery of this species in North Carolina.

Dyschirius larochellei Bousquet

Accomack Co.: Assateague Island, Chincoteague National Wildlife Refuge, "cattle gate site", 10 August 1998, uv, S. M. Roble, VDNH (3).

This species was described by Bousquet (1988), who differentiated it from *D. erythrocerus* and cited records for nine eastern states (New Hampshire to Florida and Texas). Bousquet & Larochele (1993) listed records for 10 states plus three provinces in northeastern Canada, and Bousquet (2012b) finally added Virginia to the known range but without details. It also occurs in the Bahamas, Cuba, Hispaniola, and Mexico (Bousquet, 2012b).

Dyschirius pallipennis (Say)

City of Virginia Beach: False Cape State Park, Wash Woods Environmental Education Center, 6-7 July 2005, uv, S. M. Roble, VDNH (1).

Table 1. Changes to the Virginia list of Carabidae since the report by Hoffman et al. (2006), including previously overlooked references. *Clindidium apertum allegheniense* (Rhysodidae) is also reported as new for Virginia in this paper. An asterisk after “New species” signifies that the type locality is in Virginia. B&L93 = Bousquet & Larochelle (1993).

Species	Type of record	Comments	Reference
<i>Anillinus erwini</i>	New species		Sokolov et al. 2004
<i>Bembidion arenobilis</i>	New species*	Listed as <i>B. arenobile</i> in Bousquet (2012b)	Maddison 2008
<i>Bembidion iridipenne</i>	New species	Replaces <i>B. incrematum</i> on list	Bousquet & Webster 2006
<i>Bembidion paraenulum</i>	New species*	Replaces <i>B. aenulum</i> on list	Maddison & Arnold 2009
<i>Bembidion rothfelsi</i>	New species*		Maddison 2008
<i>Loxandrus icarus</i>	New species*		Will & Liebherr 1997
<i>Maronetus hoffmani</i>	New species*	Placed in the genus <i>Scaphinotus</i> (subgenus <i>Maronetus</i>) by Bousquet (2012b)	Barr 2009
<i>Platynus daviesi</i>	New species*	Replaces <i>P. parnarginatus</i> on list	Bousquet 2012a
<i>Pterostichus barri</i>	New species*	Replaces <i>P. palmi</i> on list	Bousquet 2006b
<i>Serranillus septentrionis</i>	New species*		Sokolov & Carlton 2008
<i>Acupalpus pumilus</i>	Added to VA list		Bousquet 2012b
<i>Agonoleptus rotundicollis</i>	Added to VA list		Bousquet 2012b; this paper
<i>Agonoleptus thoracicus</i>	Added to VA list	Treated as a synonym of <i>A. conjunctus</i> in B&L93	Bousquet & Messer 2010
<i>Agonum galvestonicum</i>	Added to VA list		Hoffman 2010
<i>Agonum rufipes</i>	Added to VA list		Bousquet 2012b; this paper
<i>Agonum tenue</i>	Added to VA list		Bousquet 2012b
<i>Amara flebilis</i>	Added to VA list	Treated as a synonym of <i>A. angustata</i> in B&L93	Hieke 2000
<i>Amara latior</i>	Added to VA list		Bousquet 2012b
<i>Amara littoralis</i>	Added to VA list	Examined specimens from all continental U.S. states	Hieke 2000
<i>Amara ovata</i>	Added to VA list	Exotic	Hieke 2000
<i>Badister flavipes flavipes</i>	Added to VA list	New state record	This paper
<i>Badister grandiceps</i>	Added to VA list	New state record	This paper
<i>Bembidion antiquum</i>	Added to VA list	Treated as a synonym of <i>B. chalconeum</i> in B&L93	Maddison 2008
<i>Brachinus fulminatus</i>	Added to VA list		Bousquet 2012b
<i>Brachinus perplexus</i>	Added to VA list		Bousquet 2012b
<i>Bradycellus tantillus</i>	Added to VA list		Hoffman 2010
<i>Calosoma sycophanta</i>	Added to VA list	Exotic; additional records in Carrington (2002) thesis	Evans 2009
<i>Clivina acunducta</i>	Added to VA list	Treated as a synonym of <i>C. americana</i> in B&L93	Bousquet 2009
<i>Dyschirius erythrocerus</i>	Added to VA list	New state record	This paper
<i>Dyschirius larochellei</i>	Added to VA list		Bousquet 2012b; this paper
<i>Dyschirius pallipennis</i>	Added to VA list	Say (1823) cited as source of VA record	Bousquet 2012b; this paper
<i>Elaphropus saturatus</i>	Added to VA list		Hoffman 2010
<i>Lebia atriceps</i>	Added to VA list	Western species far out of range, probably as a result of anthropogenic transport to a military base	Hoffman 2010
<i>Lophoglossus vernix</i>	Added to VA list		Will 1999
<i>Loxandrus celer</i>	Added to VA list	Cited VMNH specimen from Virginia Beach	Bousquet 2012b
<i>Loxandrus crenatus</i>	Added to VA list		Bousquet 2012b
<i>Loxandrus duryi</i>	Added to VA list		Bousquet 2012b
<i>Oodes americanus</i>	Added to VA list		Bousquet 1996
<i>Pasimachus punctulatus</i>	Added to VA list	Carrington (2002) thesis cited as source of VA record	Bousquet 2012b; this paper
<i>Platynus opaculus</i>	Added to VA list	Not recorded for VA in Bousquet 2012b list	Evans 2008
<i>Tachys oblitus</i>	Added to VA list		Hoffman 2010; this paper
<i>Tachys rhodeanus</i>	Added to VA list		Bousquet 2012b
<i>Scaphinotus ridingsii</i> ssp.	Addition/deletion	<i>S. ridingsii monongahelae</i> added to VA list and <i>S. r. internedia</i> synonymized with <i>S. r. ridingsii</i>	Bousquet 2012b
<i>Cicindela limbalis</i>	Deleted from VA list due to taxonomic uncertainty	Genetic study of a Virginia population by Woodcock & Knisley (2010) concluded that <i>C. limbalis</i> , <i>C. splendida</i> , and <i>C. denverensis</i> may represent one species.	Bousquet 2012b
<i>Cicindela puritana</i>	Deleted from VA list	No known Virginia records; listed as <i>Ellipsoptera puritana</i> in Bousquet (2012b)	This paper
<i>Elaphropus levipes</i>	Deleted from VA list	Synonym of <i>E. xanthopus</i>	Bousquet 2012b
<i>Loxandrus inferus</i>	Deleted from VA list	Synonym of <i>L. velocipes</i>	Will & Liebherr 1997
<i>Scaphinotus hubbardi</i>	Deleted from VA list	Listed erroneously for VA by B&L93	Bousquet 2012b
<i>Bembidion stephensi</i>	Needs confirmation	VA record in B&L93 needs confirmation; exotic	Bousquet 2012b
<i>Diplocheila striatopunctata</i>	Needs confirmation	VA record in B&L93 needs confirmation	Bousquet 2012b
<i>Selenophorus palliatus</i>	Needs confirmation	VA record in B&L93 needs confirmation	Bousquet 2012b
<i>Tetragonoderus intersectus</i>	Needs confirmation	VA record in B&L93 needs confirmation	Bousquet 2012b
<i>Badister micans</i>	Name change	Replaces <i>B. ocnularis</i> on list	Bousquet 2012b
<i>Dyschirius sublaevis</i>	Name change	Replaces <i>D. filiflorus</i> on list	Bousquet 2012b
<i>Loxandrus vulneratus</i>	Name change	Replaces <i>L. vitiosus</i> on list	Bousquet 2006a
<i>Pterostichus praetermissus</i>	Name change	Replaces <i>P. commutabilis</i> on list	Bousquet & Webster 2004
<i>Stenocrepis mexicana</i>	Name change	Replaces <i>S. quatuordecimstriata</i> on list	Bousquet 1996

The distribution of this small beetle (3.5-4 mm) appears to be northern (Bousquet & Laroche, 1993: Quebec to Alberta, south in the interior to Texas and on the Atlantic Coast to New Jersey). Bousquet (2012b) noted that “coast of Virginia and Florida” was cited in the range statement of the original description (Say, 1823). Despite extensive sampling in coastal Virginia habitats in recent decades, only one confirmed specimen of *D. pallipennis* has been collected.

BEMBIDIINI

Bousquet & Laroche (1993) listed only two species of the diminutive genus *Paratachys* (treated as a subgenus of *Tachys* by Bousquet, 2012b) for Virginia. Hoffman et al. (2006) reported five others and Hoffman (2010) added *T. oblitus* Casey, though he failed to note it was the first Virginia report. Bousquet (2012b) listed *T. rhodeanus* Casey for Virginia but without details. We lack records for the latter species, but provide additional records for *T. oblitus*.

Tachys oblitus Casey

VMNH has 16 specimens (6 det. R. L. Davidson) from 10 localities in eight eastern Virginia counties: Accomack (Assateague Island), Dinwiddie (Ft. Pickett), Greensville (two sites near Skippers), Henry (Ridgeway), Isle of Wight (Antioch Pines Natural Area Preserve), Northampton (Savage Neck Dunes Natural Area Preserve), Prince William (Bull Run Mountains Natural Area Preserve; Quantico Marine Corps Base), and Sussex (4 mi SE of Sussex). Capture dates range from 21 May to 15 September.

Most of the reported jurisdictions for this species are in the northeastern United States and adjacent Canada, but its overall range extends from Quebec south to North Carolina and Alabama, thence west to Iowa and Texas (Bousquet, 2012b).

LICININI

Badister flavipes flavipes LeConte NEW STATE RECORD

Clarke Co.: 4.1 mi W of Paris, Shenandoah River at Hwy. 50 [= U.S. Rt. 17/50], ca. 400', 2 July 1970 (2), 3-4 July 1970 (1), all T. L. Erwin and L. J. Erwin (USNM). *City of Fairfax*: Fairfax, 1928 (2) and 1933 (1), all A. Nicolay (USNM; months/days illegible). *City of Richmond*: James River Park at “The Wetlands”, 8 April 2011, S. M. Roble, VDNH (1).

Ball (1959) recognized two subspecies north of Mexico (and a third in Mexico), largely on the basis of

color differences, but Bousquet (2012b) synonymized *B. f. laticeps* Blatchley with the nominate form. This subspecies ranges from New York to Nebraska, south to Florida and Texas, and has also been recorded from the Bahamas (Bousquet, 2012b). It was previously recorded from Maryland and the District of Columbia, so its presence in Virginia was expected. At 6 mm, black, and iridescent, this beetle superficially resembles a species of *Bembidion* at first glance.

Badister grandiceps Casey NEW STATE RECORD

VMNH has 23 specimens from six localities in eastern Virginia: *Accomack Co.*: Assateague Island, Chincoteague National Wildlife Refuge, pond west of Ragged Point Trail, 11 August 1998, uv, S. M. Roble, VDNH (1). *Isle of Wight Co.*: Blackwater Ecological Preserve, 7 km S of Zuni, pine barrens, 1 July 1994, uv, S. M. Roble, VDNH (2); Antioch Pines Natural Area Preserve, 5 km S of Zuni, 21 May 1996, uv, S. M. Roble & R. L. Hoffman (14). *King and Queen/Middlesex Co.* line: Dragon Run Swamp, Big Island, 1.5 mi SE of Va. Rt. 602, 8 June 1999, uv, C. S. Hobson & A. Belden, VDNH (4). *Prince William Co.*: Quantico Marine Corps Base, Camp Upshur, 7 June 1999, uv, A. C. Chazal, VDNH (1) [record omitted from Hoffman, 2010]. *Sussex Co.*: Chub Sandhill Natural Area Preserve, 11 May 2000, uv, C. S. Hobson, VDNH (1).

The distribution of this species is primarily northern (Nova Scotia and Prince Edward Island to British Columbia, south in the interior to Kentucky and Nebraska and on the Atlantic Coast to Washington, DC; Bousquet, 2012b). Considering that the type locality is the District of Columbia (Casey, 1920), it is surprising that this species was not recorded from Virginia previously. The records cited above represent a slight southward extension of the known range.

HARPALINI

Agonoleptus rotundicollis (Haldeman)

Cumberland Co.: 2 km SW of Columbia, clearcut north (DF), 1 May 1990 (4), 17 May 1990 (2), 1 July 1990 (1), 16 July 1990 (1); hardwoods north (DF), 1 May 1990 (1); 7 km SW of Columbia, hardwoods south (DF), 15 August 1990 (1); all J. C. Mitchell. *Rockingham Co.*: 2.5 mi WNW of Brown Mountain Overlook, 2565', pine-oak-heath talus slope, Shenandoah National Park, 28-29 June 2005, uv, A. C. Chazal and S. M. Roble, VDNH (Shenandoah National Park collection, 1; det. A. V. Evans).

This small, primarily northern species (formerly known as *Stenolophus rotundicollis*) was added to the Virginia fauna by Bousquet (2012b) without details. He reported the range as extending from Quebec to Minnesota and south to the Carolinas and Mississippi.

PLATYNINI

Agonum rufipes Dejean

Cumberland Co.: 2 km SW of Columbia, clearcut north (DF), 2 March 1990 (1); 5.5 km SW of Columbia, clearcut south (DF), 2 March 1990 (1), 2 April 1990 (1); all J. C. Mitchell. *Pulaski Co.*: Radford Army Ammunition Plant, Dublin facility, Train Pond, DF 5, 6 May 1998, S. Garriock (1). *City of Virginia Beach*: Dam Neck Navy Base, dune DF site, 12 October 1990, K. A. Buhlmann, VDNH (1).

Bousquet & Laroche (1993) recorded this species from many eastern states (also Arizona and California) and the District of Columbia, but not Virginia. Bousquet (2012b) added *A. rufipes* to the state list without details. The few VMNH records indicate that it is not often collected in Virginia.

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